Electricity on the Farm

A Monthly Magazine for the Progressive Rural Family

July 1930

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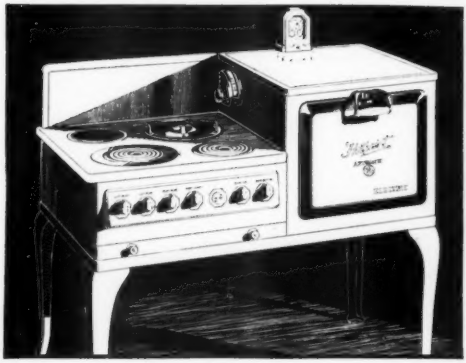

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Electricity on the Farm

Vol. 3 JULY, 1930 No. 7

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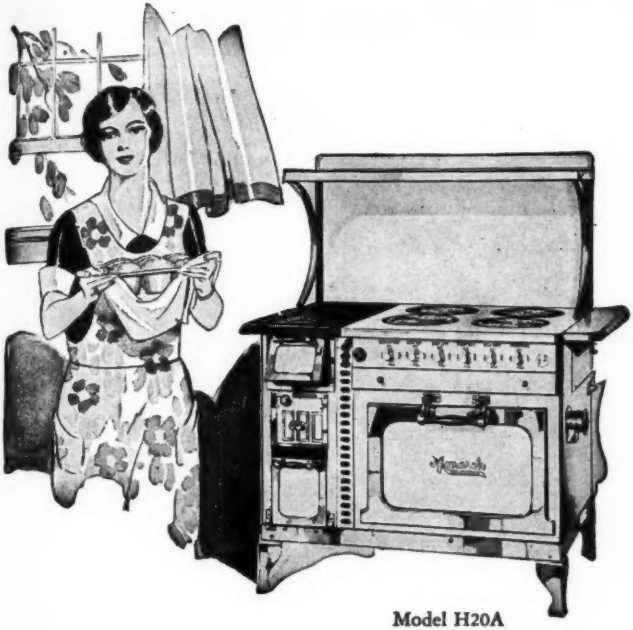

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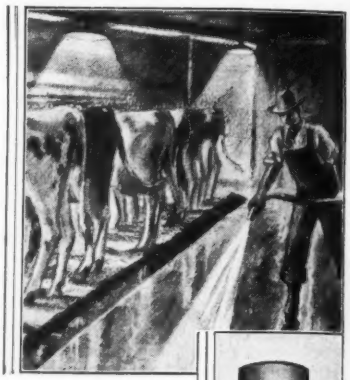

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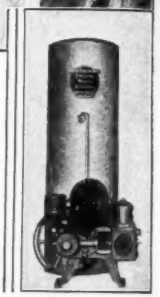

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Save time and avoid hard work . . .
for 20 cents a week

No woman within reach of electric current can afford to wear herself out over a wash-board and tub and hand wringer—when an electric washer actually cleans better and costs only a few cents a week to operate.

Perhaps the children or the home garden may deserve more of your time. There are so many things that you really *want* to do. An electric ironer will save hours. You can sit at the work while it quickly does the large, straight pieces as well as the small ones—no carrying of six-pound flatirons.

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When your farm is wired for electricity, be sure to install plenty of convenience outlets so that electric appliances can be plugged in wherever you want to use them. With a sufficient number of properly located switches, you will find them an economy in the long run.

And make sure that the materials are of the best quality. The easiest, safest way is to install a G-E Wiring System. Ask your power company about it. You will be surprised to find how easily it can be installed—surprised at the low cost of operating an electric washer or ironer.

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Electricity on the Farm

Vol. 3 JULY, 1930 No. 7

Farm home now coming into its own

At the recent convention of the National Electric Light Association at San Francisco, M. S. Winder, Executive-Secretary of the American Farm Bureau Federation, made the following statement:

"We believe that the generous use of electricity on the farm will be the means of saving the farm for the family unit (as opposed to large scale corporation farming). In all of the operations of agriculture there are many burdensome tasks, formerly done by expensive man power but which we are beginning to discover can now best be performed by the use of mechanical power. The chores which occupy much of the time of every family on a farm, which is properly diversified and which is provided with livestock, can be done so much more cheaply and easily where electrical power is available. These uses of electricity in agriculture are increasing year by year until on thousands of farms today electrical power displaces an extra hired man; it relieves members of the family of many burdensome tasks so that their time can be devoted to other important activities, or it may provide them with some leisure, something which, too often in the past, the farm family have been denied.

"Not only is the generous use of electricity important as an aid to doing the farm work itself, but in the farm home it is soon found to be almost indispensable.

It was but a few years ago that electricity on the farm was looked upon more as a luxury than an economic necessity. Furthermore, the majority of farmers, as well as many of the power companies, did not believe the extension of central station service to farms was practicable.

But the willingness on the part of farmers to use current for many operations, as well as improvements in equipment for the transmission of electric current with smaller losses, resulted in the present nation-wide movement to electrify farms.

It will not be long until the average farm home can boast of many advantages not enjoyed by the city, a condition which will reverse matters. City conveniences have always been a magnet to those who have had to put up with the rigors and discomforts of farm life, but with electric service available on the farm, and with all that brings, the farm homes will have distinct advantage over city homes—particularly in the absence of smoke, noise, and other unavoidable attendants upon city life.

For Better Milk at Less Expense

By J. C. Scott

"ELECTRICITY is the greatest boon in America to those farmers who have access to it," declares Mr. J. L. Marstrand, owner of the Grand-Pre-Purebred Jersey Farm at Parkland, Washington.

Mr. Marstrand and Part of His Herd

Practising what he preaches, or rather preaching as the result of practical experience, Mr. Marstrand explains how, by the help of electricity, his 70 head of jerseys—30 head milked with milking machine—are cared for in a fraction of the time it required to care for them without electric service.

A Time Saver

"We used to stand here for an hour and a half cutting mangles by hand," exclaimed Mr. Marstrand, "where now it requires only 10 minutes to cut the same amount with a root cutter driven by a small electric motor.

"Before we had electric service one man spent two hours each evening watering the cows by hand. We spend no time for such work any more, as an electric pumping system delivers water to drinking cups in the barn where the cows can drink any time of day or night.

"Of course such a system reduces labor and expense in operating a dairy farm, but that is not all. Here is the important thing that happened in our case. We actually brought the cows up in their milk flow during cold weather after installing those drinking cups. Cows always give more milk when they can drink plenty of warm water at any time they want it."

Warming drinking water for the cows in winter is another advanced idea put into practice on the Grand-Pre Farm.

"If you want to get good milk, and lots of it," continued Mr. Marstrand, "have contented cows. Let them have water any time they want it. Keep them healthy—lots of water is important in keeping a herd of cows free from compaction and other similar troubles.

"When cows are nervous for any reason—scared of the men who care for them—they simply do not produce. A milking machine is a wonderful thing for the cows; it tends to make a better milk flow, because the machine does not worry cows as most milkers do."

In the Milk House

Besides using lights everywhere in and about the buildings, which helps to reduce time in caring for the stock, Mr. Marstrand puts electricity to work in the milk house. It helps to wash and sterilize the bottles and milking utensils, and furnishes water in abundance, so necessary where certified milk is produced.

The milk house is also equipped with an electric milk cooling system and refrigerating box.

"We are producing the best milk we know how to produce," says Mr. Marstrand, "and electricity is a necessary adjunct in this connection. We use lots of it."

Choosing and Using an Electric Motor

By W. C. KRUEGER*

THE electric motor offers many advantages as a source of farm power. It is clean, quiet, and smokeless; it greatly reduces the fire hazard, is instantly started even in the coldest weather, and has a remarkable capacity for handling overloads. There are very few wearing parts and these are easily and cheaply replaced. Many motors under hard service have run 10 to 20 years with no adjustments other than for brushes.

Stationary or Portable?

Several questions confront the buyer of a motor for farm use. First, is a stationary or a portable motor needed? This depends largely on the equipment operated. Power jobs that occur daily usually require a stationary motor, ready for instant use. Examples of such uses are the milking machine, cream separator, water pump, emery wheel, and, in large dairies, the feed grinder.

Many power jobs, however, are of seasonal or infrequent occurrence and a considerable saving in investment or in power charges can be effected by using one power unit for all of them. Portable farm motors are now available in several makes. The motor is mounted on a 2- or 4-wheel truck and is fully equipped with switches and fuses to make it an independent power unit. It is moved to the job, instead of moving the job to the motor, as in the case when a line shaft is used for distributing power to several units from one stationary motor. Direct belting is more efficient than line shaft transmission. "Plug in" outlets can be placed wherever the motor will frequently be used.

Another consideration in buying a motor is size. Portable motors are commonly available in 3-, 5-, 7½-, and 10-horsepower sizes. The motor should be large enough to take care of the maximum farm power demand and small enough to avoid high investment and service charges. For silo filling the motor may be 5-horse-power if a filling speed of 5 to 10 tons an hour is sufficient, and 7½ for increased demands. Common burr type feed grinders will require from 5- to 7½-horsepower for the 6- to 10-inch sizes. Hammer type feed grinders developed especially for electric operation have been limited to 5-horsepower and are also available in 2- and 3-horsepower sizes.

Most of the other power jobs fall below the requirements for silo filling and feed grinding. The efficiency of a large motor doing little jobs does of course fall somewhat below normal, but the current used in very nearly proportional to the power used, regardless of the size motor. Generally it is better to employ a small motor a longer time than to rush the job by using a large motor fewer hours.

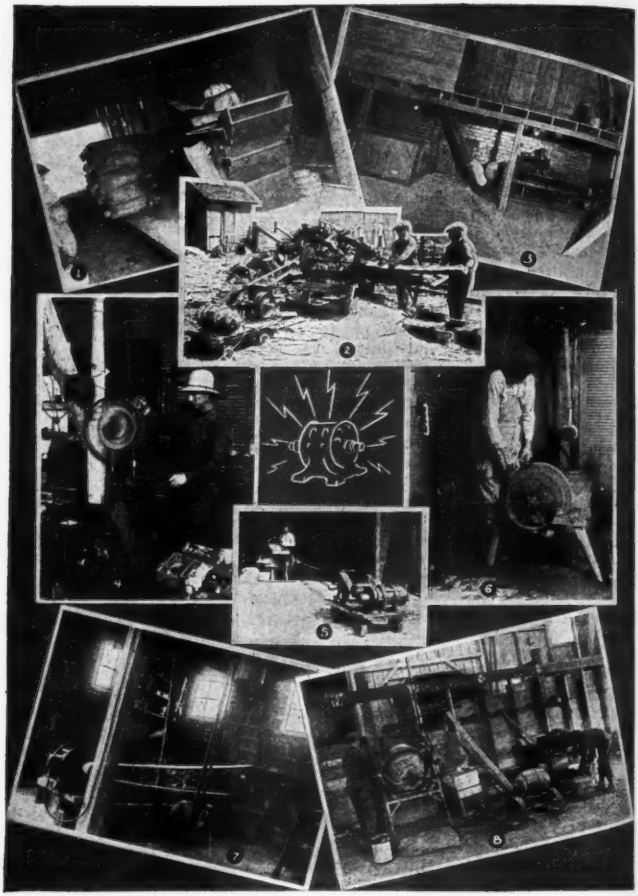
The matters of speed and voltage are standardized. Whenever possible, motors should be operated on 220 volts. The 1,800 r.p.m.* motor, operating at approximately 1,760 r.p.m. under full load is the standard.

Protection Is Good Insurance

Portable motors, like all other farm motors, should be protected against over-loading and overheating. They are generally equipped with a thermal overload relay and under voltage cut-out. Do not buy the ordinary fuses which melt and

*Extension Specialist in Rural Electrification, University of Wisconsin.

* Indicates revolutions per minute.



The Electric Motor at Work on the Farm

1. Harry Erod of Mitchell, Indiana, uses a small portable motor to fan his wheat.
2. Five H.P. farm utility motor developed for small power operations on the farm, sawing wood at the Pinney-Purdue Farm at Wanats, Ind.
3. Cutting up dry roughage with electric motor for feeding the pure bred Guernsey herd of Barty Brothers at Valparaiso, Ind.
4. Electric drill in farm workshop of C. O. Jarrell near Frankfort, Ind.
5. A grinding job being done by motor on the Sarpowski Farm near Schenectady, N. Y.
6. Glen Goodwin of Wanatah, Indiana, using a portable electric motor to run his grindstone.
7. Grinding feed with electric motor on the farm of Chas. Miller, West Lafayette, Ind.
8. Putting oats through fanning mill and then treating it with ceresan at the rate of three ounces per bushel on the farm of former Gov. W. T. McCray, Kentland, Ind. The oats are treated in a concrete mixer, three bushels at a time for three minutes. Thirty bushels are handled per hour, the mixer and fan mill both being operated by an electric motor with current coming from rural high power line.

which are often repaced with fuses too heavy to protect the motor. The difference in price is justified from the standpoint of convenience and protection.

Use Motors Throughout the Year

Motors provide power very economically and give the greatest returns on the money spent for them when they are used for as many jobs as possible throughout the year. Of course, the stationary motor has its daily job. Milking requires approximately 2½ kilowatt hours a cow, monthly. The water supply motor takes from 1 to 2 kilowatt hours of energy for every thousand gallons pumped and on the average farm requires only between 15 and 25 power units a month.

Two thousand pounds of milk can be separated at a power cost of 1 kilowatt hour; six thousand bottles can be washed with the same amount of power. Electric dairy refrigeration requires approximately 1 kilowatt hour for every hundred pounds of milk cooled to 45 degrees F.

Winter Uses of Motors

On most farms a portable chore motor can be used to good advantage every month in the year. Home feed grinding can be recommended when 10 tons or more of feed are ground each year. The power cost will vary with the fineness and with the kind of grain, but ranges between 3 and 6 cents a bag.

To make grinding on the farm an economical process, the mill and its arrangement should be such that an attendant is unnecessary. Many such installations have already given several years of practical service and have proved entirely satisfactory.

Wood sawing is another winter job often made disagreeable by cold weather engine troubles. A motor works best in cold weather, is instantly started and has the necessary quick response to the changing power demands in sawing. In a recent demonstration in Morris County a 5-horsepower motor, operating a 30-inch saw, proved capable of cutting seasoned body maple 12 to 14 inches in diameter. This was an overload for the motor but proved its stamina. Wood sawing takes about a kilowatt hour of electricity a cord. Other winter jobs readily handled by electric power are feed mixing, corn shelling, husking, and shredding, and fodder cutting. Occasionally we find a farm hay press operated by the chore motor.

In the Spring

Spring is the season for farm repairs and for getting equipment into shape. The farm concrete mixer requires very little current, especially since the motor is easily shut off between mixes. Hours of labor can be avoided by running the emery wheel or grindstone with a motor. Even such a small job as this can be handled economically with the farm chore motor. Disks, plow points, cultivator shovels, hand tools and the many edged tools on the farm are quickly and easily sharpened on power-driven cutting stones.

Summer brings hay making, and many a back-breaking hour may be saved by the use of hay unloading equipment. The hay hoist owner cuts barn time to a minimum and greatly facilitates unloading. Ease of control particularly fits the electric motor to the job of driving the hoist.

In the fall we have silo filling; an ideal chore for the portable motor; threshing can often be done with this small power, also elevating corn and grain by means of conveyors or blowers, and such specialized jobs as grading potatoes and fruit, and operating vegetable and fruit washers.

Man power has always been the most expensive form of power, and when it can be eliminated by the use of economical mechanical power good management demands the substitution. With each mechanical horsepower doing the work of 10 men, the user of motors or engines has a veritable army at his command.

Watching a One-Man Crew Do a Very Nice Job

Using a Motor for Silo Filling

By E. R. Meacham

I HAVE often stood in the crowd around the tall silo at the side of the beef barn and watched Professor E. W. Duffee engineer a job of filling silo with a 5 H.P. motor. The beef barn, you will remember if you know the Wisconsin College of Agriculture, is just below the big stock pavillion on the back campus.

These silo filling demonstrations keep the people of the state informed on the work the college is doing with various ensilage cutters and the tests with the power that runs them. There is probably no one in the country that knows more about silo fillers than Professor Duffee. He has been studying them for a good many years, their design, their power requirements, their capacities. Many improvements in the design of modern cutters can be traced to his studies and the recommendations he has made to the manufacturers.

The cutters Professor Duffee uses for these demonstrations and that the college recommends for use with small motors must meet certain distinct requirements of size, type and fan design.

A throat width of 12 to 13 inches is preferred because with that size it is easy for the man on the wagon to drop the bundles so they pass readily into the cutter. This avoids the need of another man to feed the machine. There is generally no need of buying a larger and more costly machine though 15 inch cutters have been operated successfully with 5 H.P. motors.

Cutters of the flywheel type are used for three reasons. They usually have a somewhat simple

mechanism and therefore seem to run easier. With the flywheel machine the motor is set off to one side and the belt does not run alongside the feed table and out beyond it. This makes it easy to drive the load across at the end of the table so that the driver can drop the bundles accurately upon it. Then, too, the straight knives on the flywheel are probably easier to adjust. They can be changed more quickly and it is certainly easier for the average man to do a good job of sharpening them than the spiral knives of the cylinder type cutter.

Select for Efficiency

The fan must be so designed that it will elevate efficiently at low speed. This is the secret of success with a small motor. We cannot depend on the fan to blow the corn up the pipe; it must throw it up. So the fan wings must fit the housing very closely. There should not be more than an eighth of an inch clearance at the ends and very little more at the sides.

Unless they do fit tightly the slow moving fan wings will not sweep the ensilage cleanly out of the housing. The so-called blower pipe should be reasonably small so it will not be necessary to move a large volume of air through it, and it is also an advantage if it is offset where it leaves the fan housing so that its center line rather than its outside edge is tangent to the circle which the wings describe.

The most efficient speed for an ensilage cutter — the speed that takes the least power—is the slowest speed at which it will run and still elevate. Driving a filler at 400 R.P.M., a 5 H.P. may be able to cut a very respectable amount of ensilage and keep it flying into the silo and yet be barely able to turn the same cutter empty at 600 R.P.M. Excess speed eats up power tremendously.

You can obtain the right speed for your own cutter by changing its pulley size, of course. The ordinary farm motors usually run at 1750 R.P.M. when loaded and often have pulleys about 5½ inches in diameter. This formula will give the proper size for the cutter pulley to get the speed you want.

$$\frac{\text{m. p. diam.} \times \text{m. R.P.M.}}{\text{Cutter R.P.M.}} = \begin{cases} \text{Cutter} \\ \text{p. diam.} \end{cases}$$

Note:
m = motor
p = pulley

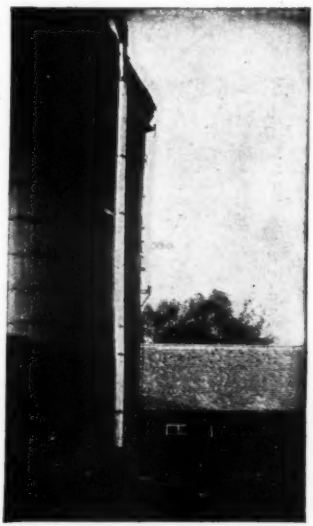
For example, suppose your silo is 40 feet high above ground and that your filler has a fan 42 inches in diameter. The table shows that the filler should run at 435 R.P.M. If you plan to use a standard portable farm motor with a 5½ inch pulley, you can calculate the size of the filler pulley by the formula as follows:

$$\frac{5\frac{1}{2} \times 1750}{435} = 22$$

5½ times 1750 = 9625
9625 divided by 435 = 22.1

There is always a little slippage so a 22 inch pulley will be just right.

The belt that carries the power plays no mean part in a successful job. It must be pliable enough to fit snugly around the motor pulley to give good contact. Because the



A Little Motor Fills a Big Silo

motor pulley is small a stiff belt will not do. Water proof leather is the best material for this purpose, but ordinary leather is also good. In either case the belt should be only single ply. If rubber or stitched canvas is used, it should be only 3 or 4 ply,—never thicker. A 4 inch belt may be satisfactory, but a width of 6 inches is much better as the belt need not be kept so tight. Good results cannot be expected if the motor pulley is too small to get a reasonable grip. Probably 4½ inches in diameter by inch face is the smallest practical size.

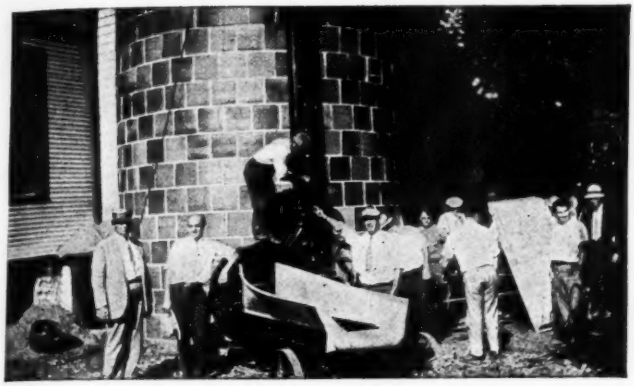
There are still other factors that influence the amount of corn a small motor will cut and elevate; a most important one is the sharpness of the knives and the way they meet the shear bar. Professor Duffee says,

"Put on sharp knives every half day if you are doing any amount of cutting. It is best to have an extra set and to sharpen both sets after every day's run. If you let those knives get dull, you are bound to have trouble. And be careful to grind them so as to keep their original long bevel. Don't dub them off, for that makes them cut hard. Then set them up just as close to the shear bar as they can possibly be without actually hitting it. That shear bar is the other blade of the scissors and the two blades must act together if they are really going to cut instead of break or tear the corn apart. Examine the shear bar once in awhile and see that it is sharp too. In some machines you can turn it over so as to use all four edges."

Another aid to easy running is proper lubrication. It is not enough merely to put grease in the cups, you must see that it reaches the bearings. And it is not enough to squirt oil in the holes that are readily visible. You must find a way to lubricate every shaft and gear. Some of the better fillers have a tight transmission case somewhat like that of an automobile. This case should be kept loaded with good grease or heavy oil.

It will be worth your while to set the cutter up carefully. The pipe should stand perfectly straight, and should be as nearly plumb as practical. Many cutters have a flexible coupling or collar where the pipe joins the fan housing to take care of a small angle in the

The Bundles Go Through Nicely with No One at the Feed Table



Putting on a Demonstration at the University of Wisconsin

pipe at this joint, but there should be no such angle if the fan is to throw the ensilage through the pipe most effectively and with the least resistance. Even if the pipe leans toward the silo a little, it is usually possible to bring it into the plane in which the fan revolves by blocking up the wheels to raise the outer end of the feed table. If the pipe has a telescoping section, be sure that the small end is down.

"We are recommending small motors for silo filling because a motor is easy to start, and electricity is such ready, handy power," says Professor Duffee, "You do not have to play around with water or gasoline, or have to get out and fire up to get steam. This is a fast method, not in tons an hour, but in the total time required to get your job done and exchange labor with the neighbors. The small crew is always busy; there is no waiting for each other. One man on the binder with three horses can cut six or seven acres a day. That will keep ahead of the cutter. If the haul is a long one, it will take three or four teams to keep the cutter busy. You do not need a feeder at the machine.

Rather careful records of the silo filling were taken on the Peter Doyle farm near Portage a couple of years ago. They ran the cutter at 435 R.P.M. with a 5½ inch pulley on the motor and a 22" pulley on the cutter. The gears were set for ¼" cut. There were six men on the job, four of them were hauling corn. In the forenoon of the Wednesday they began filling they put twenty loads of dry corn that had been cut since the Saturday before into a silo 14' x 36'. They began work at 8:15 and stopped just five minutes before noon. The current for power to cut those twenty loads was just 19 KW. hrs.

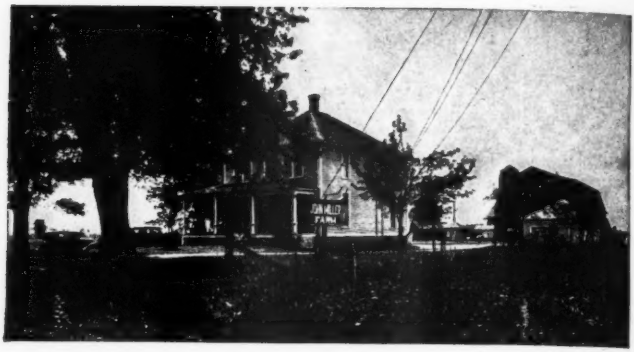
At noon they put on sharp knives and changed to two instead of three. They also lengthened the cut for ¼" to ½". They started filling again at 1:45 and by ten minutes after six they had put in twenty-two loads more,—and had used 20 KW. hrs. of current.

Mr. Doyle figured that they were hauling about a ton and a half at a load.

That silo was full by 4 o'clock of the second day.

The field was close to the yard, so there was a short haul, but the cutter kept the four teams going pretty steadily.

When he came to sum it all up, Mr. Doyle found that he had spent 14½ hours filling the large silo, and eleven hours filling a second smaller one. He had put in 170 tons of silage with the use of 115 KW. hrs. of electricity.



The John Miller Farm near Utica was among the first completely electrified farms in Michigan

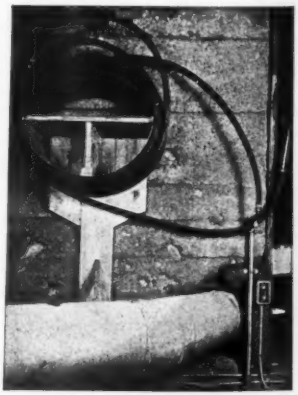
A Twelve Months'

Electric Bill

THERE is a popular impression that a farm is a place of privation, inconvenience and hardship, and that the only desirable habitat for a discerning person is a city of at least a million population. There is a good deal of talk in a sympathetic vein about bringing the city conveniences to the country. The John Miller Farm near Utica, Michigan, suggests the question: "When is someone going to propose bringing country advantages to the city?"

John Miller has a ninety-five acre dairy farm with all the recognized city conveniences and—at the same time—all of the advantages of a country estate.

Every building on the Miller Farm is wired. In the house alone, there are probably more practical application of electricity in labor-saving and time-saving appliances than any representative city home possesses. To begin with, the kitchen is equipped with an Electro-chef, electric refrigerator, electric pancake griddle, and electric water heater. In addition Mrs. Miller has an electric washer, electric iron, electric heater and electric curling iron. In the living room are two electric heaters (these are being used experimentally—they do not carry the entire

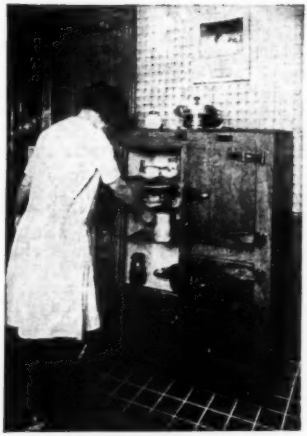


A snap of the switch throws extra water pressure behind the fire hose. Note the handy home-made reel

heating burden, but are used in conjunction with the furnace)—and an all-electric radio; in the dining room are two more experimental heaters. In the basement is the pressure tank for the house water system, and also a fire hose with a special switch to furnish added pressure ahead of the automatic switch.

The barn is as fully equipped as the house. It has a complete water system, operated by a pump jack and pressure tank; and there is a motor for running the two milking machine units. Adjacent to the cow barn is the milk house containing the milk cooler.

The poultry house is equipped with a burglar alarm. If a window or door in any of the buildings is opened, an electrical contact is made which rings an alarm bell. In addition, there is a time clock for automatically controlling the lights. This results in as much as twenty per cent increase in egg production in the winter, when prices are high. Two different types of heaters provide warm water. The lights in this building, as in all the others except the house, are fitted with reflectors.



Mrs. Miller finds her electric refrigerator an invaluable part of her kitchen equipment

The 5-horsepower portable mo-

Electrified Poultry House on the John Miller Farm

These chickens were electrically brooded. Electrical devices included are: 1. Time switch for lights; 2. Lights for increasing egg production in winter; 3. Ventilating fan for keeping house dry and healthy; 4. Motor for operating dropping-board cleaner; 5. Electrical burglar alarm; 6. Homemade, and 7. Commercial electric water heaters.

tor serves many purposes. It can be used for sawing wood, hoisting hay, filling silos, running a feed grinder, and for innumerable other tasks.

In the tool shed is an electric drill, an electric tool grinder, and an electrically operated paint sprayer—time and labor savers all.

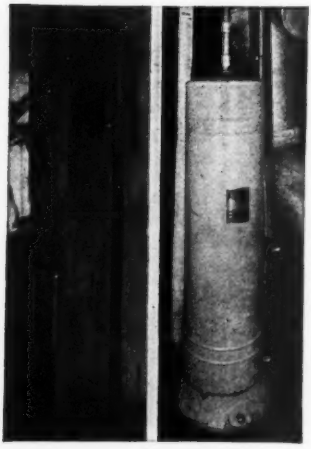
An interesting feature is the ventilating system in the barn, a series of intakes and exhausts, with two fans, one 12-inch and one 16-inch, furnish air circulation. Hung on a wall of the cow stable are three instruments; a hygrometer (for recording humidity), a recording thermometer, and a thermostat which controls the stable temperature. So accurately does this thermostat work that the indicator line on the three-day temperature chart is almost an unbroken circle, with little variation. There is a jog in the line only at regular intervals, and this is caused by the inrush of cold air when the stable doors are opened to permit cleaning. At all other times the temperature is remarkably uniform, maintained at approximately 50 degrees. Whenever the barn begins to get cold, the thermostat trips off the fans in the ventilators.

Mrs. Miller has both a wood-burning kitchen heater and an electric range

The company was anxious to know just how much electricity it would take to operate an electrically complete farm, hence during the past year a careful record was kept of the current consumed for every operation in detail. To accomplish this, sixteen meters were required.

At the end of last year, Mr. Miller's total use of electric current for the entire twelve months, figuring in all miscellaneous household appliances, was just 5413 K. W. H. It may be interesting to note just what this amount covers, and how it is divided. On the following page is the chart with the uses distributed.

A comparison between the amount of time saved on each particular job and the amount of current consumed shows plainly how profitable it is to use electricity. For instance, pumping water by hand for 21 head of cattle took an hour a day. That hour is now saved, at a cost of about one-half kwh. a day. Milking 10 cows by hand took over an hour. The time is cut in half by machine for less than a kwh. a day. Before installing a feed grinder, one-half day a week was spent in going back and forth to the mill, and Mr. Miller was obliged to keep a truck in order



Left: One of the barn ventilator exhausts, which keeps the barn dry and healthful.
Right: The automatic electric heater in the basement keeps a constant supply of hot water in the house.

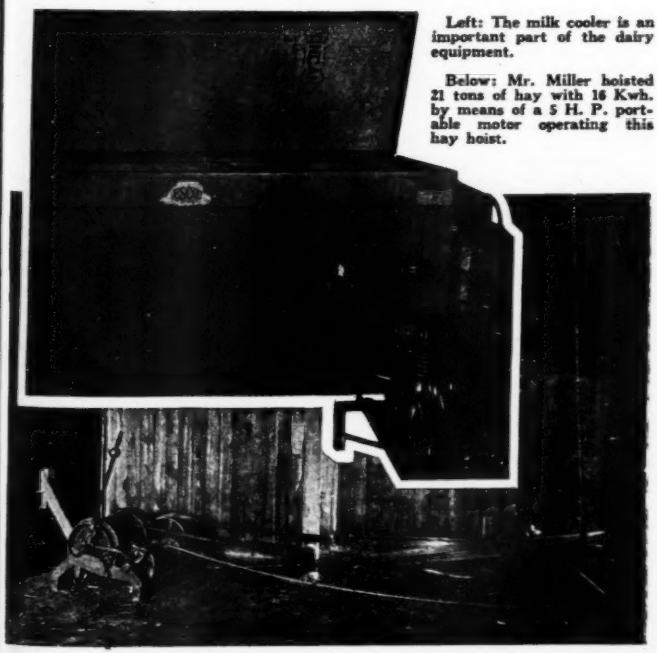
to make the six mile drive. Now he grinds his own feed for about 10 kwh. a week, saves the half day, and no longer needs the truck.

Whereas previously it required 12 men working one day to fill his 55-ton silo, the work is now done by five men, with only 40 kwh. of current.

These figures clearly demonstrate that electric service is a paying investment for the farmer when properly used. Figuring 15 per cent on the $2600 investment for interest, depreciation and upkeep, the cost amounts to $390 a year or $32.50 a month. Adding to this the cost of electric service gives us the total expense of doing the work electrically. This total cost should be compared with the fixed charges on any substitute equipment plus the expense of doing the work by hand or other power. Considering all the appliances, the work done and the time and money saved, Mr. Miller is certainly getting a bargain.

John Miller Farm
Energy Consumed During Year of 1929

	Monthly K.W.H.	Yearly K.W.H.
Water (house).....	1	13
Refrigeration (house)..	26	312
Cooking	154	1,845
Water heating (8 mos.)	94	755
Water (barn).....	16	192
Milking	27	329
Milk cooling (4 mos.)..	41	164
Feed grinding.....	44	535
Grain elevating (280 bushels oats)..... ..		6
Hay hoisting (31 tons). ..		16
Corn shredding..... ..		55
Silo filling (55 tons)... ..		40
TOTAL POWER (house and barn) 355		4,262
House power 244		2,925
Barn power 111		1,337
TOTAL LIGHTING AND MISC. APPLIANCES (house and barn)....	71	1,151
Barn lighting only.....	11	127
Total energy.....451		5,413



Left: The milk cooler is an important part of the dairy equipment.

Below: Mr. Miller hoisted 21 tons of hay with 16 Kwh. by means of a 5 H. P. portable motor operating this hay hoist.

What Refrigerator *Shall I Buy?*

By W. T. Ackerman*

As a matter of fact, there is no "best refrigerator," because we all place the greatest value on *different* qualities.

One woman may be very fastidious about her house and must have the "best looking" machine, but the design which is attractive to one may be distasteful to another. "I don't like that black stripe at the edge of the panels. It makes me think of the 'in mourning' letters and envelopes we used to use."

Another must have a quiet machine, above all else. Her neighbor remarks dryly: "Hattie, if you ever have five husky youngsters, a little *extra* noise won't make any difference. What I want is the most economical machine to operate. We must get one of those machines, but we've got to keep our expenses down in the operating costs."

Another family looks at it this way: "We really can afford to get an electric refrigerator only on one condition. It must be large enough to hold four 8-quart cans of cream in addition to the household food. Naturally, it must be able to keep that cream cold, but the other details are not important. Expense of operation? Well, of course we would like to get that down, but if we can take care of that cream I'd rather pay a good price for the current it uses and get the job done right."

Your Requirements

So the best refrigerator for you depends on your own requirements. But there are certain points that are of importance to every one.

First and foremost is the question of uninterrupted operation. If this machine won't run, or bothers a lot about running, or if you can't get the dealer to come out promptly and fix it, or they don't seem very efficient about doing their work, you'd better not buy it.

Considering Servicing Too

Since most of these possible difficulties involve your dealer and his service men, that is the first important consideration. If their intentions are merely to sell you a machine and then let you rustle your own service, the finest machine on earth will never give entire satisfaction. If, on the other hand, you know by past experience or by reliable inquiry that this particular dealer's word is as good as his bond, and he says, "If that machine isn't right, in any way, we'll *make* it right and *keep* it right"—you have there the most important element that can enter into any transaction. If you buy without this assurance of service, you buy with considerable risk.

Frequently the housewife pays little attention to this angle of the case. It is somewhat out of her province. She is apt to leave the mechanical side of any appliance to the men of the family. If trouble arises she will insist that it be fixed at once, but may not concern herself with how it is going to be done, or who is going to do it.

It has been said—and with good reason: "Deal with the concern that does the largest business," but in these days of so many large business organizations no particular one appears to exceed some half a dozen others. In this respect use the same reasoning as you do when buying a car. Is the manufacturer financially sound,

*Project Engineer, New England Rural Electrification Project.

progressive, likely to stay in business, etc.? Has he developed a machine that stands in good repute. Are the machines of his manufacture giving good satisfaction in your territory—making allowance for the fact that they are less improved than those on sale today. Attention to these questions should weed out the weaklings from your list.

Insulation

Insulation is one of these essentials. To attempt to use electric refrigeration without insulation is like trying to heat a house in winter with the doors and windows open. It is far from economical. Authorities differ somewhat on the amount of insulation, but it is pretty generally accepted that a thickness of 1½" on the sides and top and 2" thick on the bottom, is as little as we can safely use. A much better proportion is 2" in the walls and top and 3" in the bottom. Some refrigerators have still more, which is all the more to their advantage. The thicker the insulation the thicker the walls and doors will be, which is a cause of comment on the part of some of the buying public, who do not as yet understand the value it signifies.

Cabinet Construction

A majority of refrigerators today are made up of a steel or wood framework with steel outer covering, instead of wood. The use of sheet steel permits building a thinner wall and one which is not affected by climatic changes. Steel walls have very little insulation value, but have a long life if properly treated. Wood, on the other hand, adds an appreciable insulation value, but, unless properly cared for, is apt to deteriorate with relative rapidity. Climatic changes cause wood to expand and contract, which cause cracks and a general loosening up of the cabinet. A wood cabinet, not subjected to alternate moist and dry conditions, can have a long life and a total value greater than steel if it is kept dry and properly painted or varnished. In districts where dampness prevails, steel covered refrigerators are the safest proposition.

Finish

Enamel paint, varnish, lacquer, and vitreous enamel or porcelain are the four general kinds of finish in the order of their cheapness and value.

Enamel-paint is reasonable in cost, generally serviceable, but subject to wear, and is fairly easily marked or disfigured. It is also apt to fade and will need refinishing from time to time.

Varnish is very similar, but is usually more durable if a good grade is used.

Lacquer—such as is used on automobile bodies today—is somewhat more expensive, but is very durable, withstands considerable abuse, does not fade and can be easily kept bright and attractive. It's one real enemy is alcohol, which will stain or dissolve lacquer.

Vitreous enamel or porcelain is the most expensive finish and is generally considered superior to the others. This finish, which is baked on the metal until it fuses with it to form a surface as hard as glass, is impervious to almost everything—except sharp blows. When accidentally struck a sharp, hard blow the brittle enamel will chip off, leaving a black spot. There is no way of repairing such damage except by securing a new panel or part. Other than this possibility, it is attractive, easily kept clean and superior to the other finishes.

Whatever finish is selected for the outside of the cabinet, vitreous enamel is preferable for the inside. This eliminates any possibility of paint odors, is impervious to food stains and easily washed and cleaned. (Paint will dry, odorless, in due time, but lacquers should never be used on the inside of the cabinet as they give off odors almost indefinitely.)

Temperature Control

To control the amount of cold for different kinds of foods, there are two kinds of devices. In one a

(*Continued on page 26*)

Trying It Out

By French B. Armstrong

The electric brooder used during the demonstration by the Cleveland Electric Illuminating Company was subsequently kept in service

THE demonstration of electrical farming which was conducted for more than a year on my farm (by The Cleveland Electric Illuminating Company) has ended now, and the time has come to cast up accounts and determine two things; first, whether the many farmers who visited the demonstration learned anything to their advantage; and second, how I myself now stand on electrical farming.

The demonstration farm was officially opened August 1, 1928, and has closed only recently. The experiment lasted well over a year, and thus I was enabled to derive a true appraisal of the value of electrical appliances for the farm and the farm home.

The Five Maples Dairy Farm was started originally as a dairy farm, but as time went on poultry was added, so that now it really can be classed as a general farm. The farmstead itself consists of a house with laundry and workshop, a chicken house, horse barn, pony barn recently converted to an additional chicken house, granary, milk house, dairy barn, and machine shed and garage. Incidentally, it was only after electrical appliances had increased my poultry profits that I decided to convert the pony barn. Our farm home itself consists of an eight-room house with bath, with the laundry and my workshop in the basement.

For the purposes of this demonstration our house was almost entirely rewired and refixtured, all light sources being well shaded. And my farm buildings were wired in accordance with the best practice for both power and light. When these two jobs were finished, I found a convenient power outlet at every place where I needed power, and there were no dark spots in any of the buildings. Switches were placed, of course, for the greatest convenience and use.

Among the organizations which sent groups to the farm were the

Mrs. Armstrong retained her electric range and heater after the demonstration tests, despite the presence of free gas on the property

Grange associations, the Farm Bureaus and the Dairy associations; and State and County Farm tours were arranged so as to include the Five Maples Dairy Farm in their itineraries. In all, approximately 2,000 visited the demonstration, and I have estimated that of that number more than 95 per cent were farmers seeking the newest methods of using electricity on their farms.

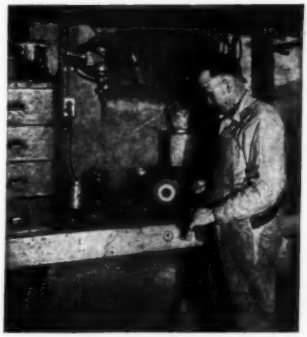
There were many electrical appliances which I found of profitable use on my farm. Among these was the fanning mill, the motor which I discovered could be used in a number of other ways. Also I kept the drill and bench grinder. These two latter appliances are not used on a farm very often, but when they are needed they pay for themselves many times over. You see, when a farm implement breaks, it happens generally in the season in which it is being most used and most needed. With the portable electric tools, I can make repairs at once.

I had a milking machine before this demonstration was arranged, but for the demonstration it was completely electrified. And now I would not go back to any other source of power. I believe that any farmer who has six cows or more can make an electrical milking machine, together with a few other pieces of electrical equipment, do the work of one farmhand.

Another thing which I had before the demonstration, and which was electrified for it, was my power water pump. I was very glad to buy the electrical pump after the demonstration. Such things pay for themselves in the dependability of their service, and in the little attention they require.

I have also found that an electrical refrigerator pays its cost many times. There is a large saving in both time and foodstuffs. This is because large quantities of foodstuffs for the farm itself can be gotten together at one time, and stored for a long period.

And as for electric cookery—you will believe that Mrs. Armstrong and myself would not be without our electric range when I tell you that my farm produces free natural gas, and that Mrs. Armstrong could have continued to cook with gas with no cost other than the initial cost of the range! But electricity for cooking saves her time, and work, and keeps her cooler and more comfortable in summer—and that's enough for me.



Mr. Armstrong would not part with many of the electrical tools on his farm after the company ended its electrical farm demonstration there

Household Appliances

As to the electrical appliances which we kept in the farmhouse, it will be of interest, no doubt, to list them. We retained our cooker, curling iron, fans, floor lamps, hand iron, heating pad, ironer, pancake griddle, percolator, corn popper, radio, range, reflector heaters, refrigerator, sewing machine, table lamps, toaster, vacuum cleaner, kitchen ventilating fan, waffle iron, washing machine, and Christmas tree lights. Isn't that some list? I have often wondered how many city homes are equipped with so many things electrical!

When we come to the field of farm appliances proper, we find nearly as long a list. We have kept our brooder, clipper, shearer, drill, emery wheel, fanning mill, barn lighting fixtures, milking equipment, poultry lighting, poultry water heater, poultry lighting time switch, soldering iron, water pump, and yard lights. That, we believe, makes a fairly well electrified farm!

Of course, there were a few electrical appliances which were installed for the demonstration, which we felt we could defer getting at once, although we plan to buy them at a later date.

I believe those two lists show conclusively what we think of electricity on the farm. I have found decreased costs with less labor, and Mrs. Armstrong has found farm life easier and more interesting with electricity.

Store the Grain on the Farm

WITH the world wheat crop for 1929 smaller than that of the previous year, it is but natural that many should be puzzled over the prevailing prices.

Some marketing specialists, however, feel that these may be explained in part by the fact that stocks in country, terminal and mill elevators are larger now than a year ago, while farm supplies show a corresponding decrease.

If their contention is correct, it would seem to point to the urgent need of providing for more adequate storage facilities on the farm, so that grain may be kept off the market and out of the visible supply until it is required. For as Secretary of Agriculture McLaughlin of Nebraska says: "When grain is stored on the farm, no one knows when it is going to be marketed." If safely stored, it may be held for one, two or even more years.

On the other hand, he points out, when grain is stored in an elevator "it is notice to the world that it will soon be on the market, for owners are not going to pay storage very long." The farm, he stoutly asserts, is the place to store grain.

The advantages of farm storage were emphasized recently by Chairman Legge of the Federal Farm Board, and the problem is being studied carefully by various experiment stations and state colleges. At the Fort Hays experiment station, Hays, Kansas, the storage of combined wheat is being thoroughly tested, and there are indications that with proper ventilation combined grain may be stored on the farm without risk.

Modern machinery is solving the problem of keeping down the cost of producing grain; and storage on the farm, in fire, rodent and weatherproof bins should go a long way toward aiding the solution of the marketing problem.

What Refrigerator?

(*Continued from page 23*)

lever is turned to increase or decrease the cold as desired. This changes the temperature of the entire refrigerator and not any one section of it.

Another manufacturer maintains a uniform temperature in the shelf section, but provides a quick freezing action in the chilling unit as well as the regular freezing trays and provides a space for the proper storage of vegetables under moist conditions.

Early machines were produced with no particular thought as to quiet running, either when new or after they were old. Now practically all manufacturers are producing machines that run very quietly.

Another feature is a cooling tank for a continuous supply of cold water. This will be particularly valuable on the farm during the hot weather.

The heart of the electric refrigerator is the mechanical unit. Fortunately, the manufacturer has settled the matter of size and capacity by making it to fit that particular size refrigerator. So select what you like, and see that it is installed well and you will "live icelessly ever after."

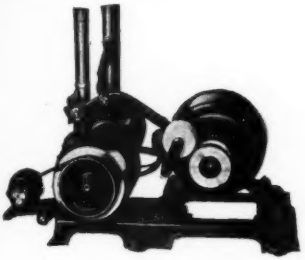
The prosecuting attorney had encountered a rather difficult witness. At length, exasperated by the man's evasive answers, he asked him if he was acquainted with any of the jury.

"Yes, sir," replied the witness, "more than half of them."

"Are you willing to swear that you know more than half of them?" demanded the man of law.

The other thought quickly: "If it comes to that," he replied, "I am willing to swear that I know more than all of 'em put together."

For the Greatest Satisfaction—Use an Electrically Operated De Laval Milker



Left: De Laval Milker Combined Motor Base. Below: De Laval Milker in operation

AN electrically operated De Laval Milker is one of the most profitable investments in time and labor saving equipment on the farm today. It is economical and convenient. It milks cows better, faster and cleaner. De Laval Milkers produce cleaner milk and can be operated by anyone, regardless of age or experience. There is an outfit for every size herd and for every requirement.

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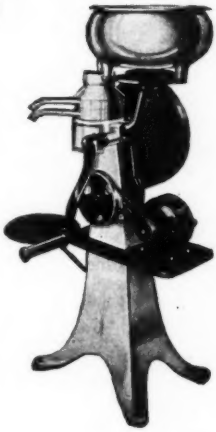

They have protected ball bearings and six other features, which make them the easiest in operation as well as the cleanest skimming separators ever made. They are beautiful, durable, and a pleasure to use and own. They can be operated by electricity.

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Artificial Drying of Hay

By W. M. Hurst*

WITH the present demand for high-quality hay and alfalfa meal, and with the ever-increasing desire to eliminate the weather hazards in their production, inventors, farmers, and other agricultural workers are busy in trying to devise practical ways and means of drying hay artificially.

Seventy to eighty per cent of the weight of forage plants such as alfalfa and grasses when cut for hay, is water. Suppose that alfalfa plants when brought to the drier contained 75 per cent of moisture and a finished product containing 12 per cent moisture is desired. On this basis 7,040 pounds of green hay would be required to produce 2,000 pounds of cured hay. This means that over 5,000 pounds of water must be evaporated to secure a ton of hay.

Stack Drying

Artificial drying of hay in the stack has been attempted in this and other countries at different times and with various degrees of success. A cone-shaped frame is erected in the field and a stack formed using the frame as a core. The drying air is usually heated with an oil burner and the hot air forced by a fan into the core or center of the stack through a pipe.

This method is simple and the equipment portable but stack-drying has not proven entirely successful. Air under pressure has a way of moving in the path of least resistance. It is difficult to build a stack of hay around a frame in such a manner that equal resistance is offered to the flow of air at all points. As the hay dries the stack settles, frequently bridging over at the top of the frame and allowing free passage to the drying air at that point. Also, in case a strong wind is blowing a large part of drying air will pass through the hay on the lee side of the stack. Unless weather conditions are favorable and the stacks are carefully made results are, as a rule, not entirely satisfactory due to uneven drying.

The Conveyor or Tunnel Type Drier

With this type of drier the hay is conveyed through the drying compartment on an endless-screen conveyor which is usually about 10 feet wide. The width and height of the drying compartment are such as to house the conveyor and to confine the drying air as it is circulated through the hay. The drier may be of almost any length desired but the usual range for a single conveyor drier of this type is from 100 to 200 feet, depending upon the capacity desired.

When an oil burner or a direct-heat furnace is used the products of combustion are drawn from the furnace, mixed with outside air in a mixing chamber, and forced through the hay by a fan With some driers the green hay is chopped into short pieces before drying while with others the plants are fed into the drier whole. In either case the dried hay is usually ground into meal with a hammer mill. The leaves dry much faster than the stems and are usually very brittle when the hay is discharged from the drier. For this reason an ordinary hay press is not suitable for baling artificially-dried hay—particularly alfalfa hay—immediately after it is discharged from the drier, as the feeder on the press shatters the leaves and may break the stems badly. However, this brittle condition of the hay when discharged from the

* Member American Society of Agricultural Engineers.

Try to find a better, *faster* washer than this Thor washer at only

$99.75

(Slightly higher in Canada, Rocky Mountain area and West.)

You can pay more but you can't get more

Here it is—the famous Thor Agitator Washer—the finest washer Thor ever built—and it is yours for only $99.75. Heretofore, you've been asked from $30 to $60 more for a washer that can be compared with the Thor Agitator. Look at the illustration! A beautifully designed washer—the tub in glistening ripple-green porcelain, inside and out. As easy to clean as a china dish. And beneath its beauty is lifetime construction—and the marvelous Agitator principle of washing, famous everywhere for its speed and thoroughness in washing clothes clean. It's the latest washer by the world's oldest makers of electric washers. Before you buy any washer know all the advantages of the Thor. Send for complete descriptive booklets — showing it in actual colors and explaining it in detail. Mail the coupon today.

Hurley Machine Company
22nd St. and 54th Ave., Chicago

Here is the Thor Attachment Iron which converts any Thor washer to a Speed Ironer in 10 Seconds. Simply lift off the wringer, set the attachment iron in place. Only $49.50.

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This Thor Agitator Washer with Speed Iron attachment $149.25. Slightly higher in Canada and Rocky Mountain area. Send for free literature.

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drier may be due largely to overdrying.

The Revolving Cylinder or Drum Drier

Cylinder or drum driers have been employed for many years for drying various kinds of materials. Their most common use, however, has been in connection with granular substances. When this type of drier is used for hay, the green hay is chopped into short pieces before drying. A cylinder several feet in diameter is supported on bearings so that it may be revolved and is mounted in such a position that one end is lower than the other. Baffles or flanges similar to those in a concrete mixer are fastened on the inside of the drum. The hay to be dried is fed into the elevated end of the revolving cylinder and is moved through the drier by the flanges. Each time particles of the hay are picked up by the flanges they are dropped nearer to the discharge, due to the slope of the cylinder. The movement of air through the cylinder may also assist in conveying the hay through the drier when the hot air is drawn or forced into the cylinder at the same end as the green hay enters. Some driers of the cylinder type, or a modification of this type, rely entirely on the air blast for moving the hay through the drier.

Sufficient information is available to show that alfalfa hay of a high grade (U. S. grade) may be secured with an artificial drier. Indeed, many believe that a higher quality hay or meal may be secured with a drier because very few of the leaves will be lost and the hay will at no time be weather-damaged, provided it is cut at the proper time.

The maximum allowable temperature of the drying air will doubtless depend somewhat upon the design of the drier. If the hot air enters the drier at the same end as the green hay, a much higher temperature can probably be used than in case a counter-current system is employed. With the latter arrangement the drying air enters the drier at the discharge end and the driest hay is subjected to the hottest air.

With the information now at hand it would be almost impossible to draw any definite conclusions with reference to the cost of drying hay artificially. To convey some idea of what might be expected in this connection, however, a hypothetical case will be considered. Suppose the drier has a capacity of 1 ton of cured hay per hour, and is operated by electric motors totaling 40 horsepower with an average efficiency of 85 per cent. Assume that a coke burning furnace is used, that the heating value of the coke is 12,000 B.t.u. per pound, and that 50 per cent of the available heat units are actually utilized in evaporating moisture. Suppose the moisture content of the hay is to be reduced from 75 to 12 per cent. Under the test conditions 840 pounds of coke and 35.1 K.W.H. of current would be required per hour. With power at 3 cents per K.W.H. and coke at $12 per ton the cost per ton of hay dried would approximate $6.05. To this amount the cost of labor, depreciation, and interest on the investment should be added.

Incomplete Information

Artificial drying of hay is yet in the experimental stage but progress is being made and research workers are constantly adding to the now meager supply of reliable information on the subject. At the present time the problems of a mechanical nature seem to be paramount. Before a complete analysis of the subject can be made, however, information relative to the feeding value of artificially dried hay and the cost of processing must be secured. Suitable harvesting equipment will be needed and the use of driers may also necessitate changes in the methods of handling, storing, and shipping hay.

The Bore: "My girl says she thinks I'm a wit."

The Bored: "Well, she's half right."

* * *

The Bride: "And what would I get if I cooked a meal like that for you every day?"

The Groom: "My life insurance."

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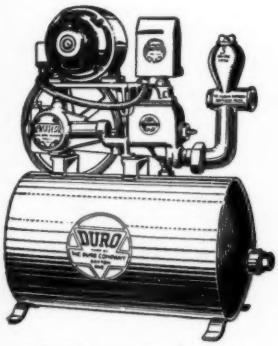

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Irrigation of Apple Orchards *in Eastern States*

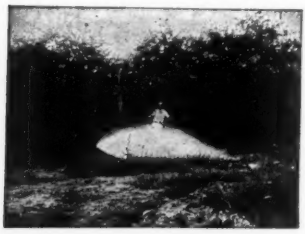
By Chas. E. Seitz

"AN APPLE a day keeps the doctor away." Whether this has made the apple such a nationally important fruit or not, the fact is that the apple is the most important of all fruits grown in this country, both in money value and the place it fills in the diet. The production of the apple, however, is a highly specialized type of agriculture which involves large costs of developing and maintenance of orchards. The large investments in good orchards make it doubly important that every precaution be taken to prevent any reduction in yields resulting from causes within the control of the orchardist.

A Virginia orchardist has demonstrated that in a dry season the irrigation of apples may increase the yield and quality of the fruit sufficiently to justify the investment in an irrigation system. During the past season, Mr. F. H. Wissler, manager of the Strathmore Orchard at Mt. Jackson, by irrigating one of his apple orchards, increased the yield enough to more than pay for the entire cost of his irrigation system. Speaking of the results secured last season Mr. Wissler says:

"I am more than pleased with the results of irrigation. I figure that my watered fruit was at least 40 per cent better quality than the unwatered. The increase in size of the apples from the watered trees was very striking. When grading the fruit from the unwatered section of the orchard most of the apples were going through the smaller rings of the grader while the majority of the fruit from the watered or irrigated section was going over the largest rings. The complete irrigation system cost me approximately $4,800 and the total operating cost for the 1929 season was $261.60. I figure that by irrigating my fruit, I increased my returns from this orchard, during the 1929 season, more than enough to pay for the entire cost of the irrigation plant."

About 2,000 trees in a block of 3,400 Staymens and Winesaps were irrigated by Mr. Wissler, during the 1929 season. The orchard under irrigation (60 acres) is located on a hill above the river. Water from the river flows by gravity through a 12-inch pipe a distance of 120 feet, to a sump near the pump house. Here is a double suction, centrifugal pump lifts the water 13 feet and then forces it against an actual head of 85 feet through 1,900 feet of 8-inch main pipe line to the orchard. Several hundred feet of 8-inch distribution pipe lines in the orchard are equipped with 4-inch hydrants, located so that water can be discharged into earth distribution ditches and conveyed to any part of the orchard. The trees are wa-



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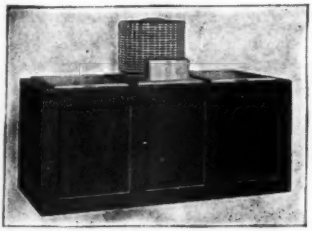

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The concrete pump house w' ich houses a double suction centrifugal pump

tered by small streams flowing through shallow furrows running parallel to the tree rows.

The concrete pump house is equipped with a door in the roof several feet above high water, to prevent flood waters damaging the pump. A No. 6, single stage, 900 gal. per min., double suction, centrifugal pump, standard fitted with 8-inch suction and 6-inch discharge pipes is mounted on a drip type base plate and direct-connected through flexible couplings to a 60-horsepower, three-phase motor.

Results Gratifying

The irrigation system was completed too late to use for the 1927 season's crop and as the 1928 season was one of normal rainfall, it was not operated that year. The drouth during the 1929 season, however, offered an excellent opportunity to test the system, with the results as indicated by Mr. Wissler. On visiting this orchard just before harvest the past season, I was impressed with the much healthier appearance and larger size of the fruit on the irrigated trees as compared to the trees that were not watered.

As an example of the increase in size due to irrigation, Mr. Wissles compares his first carload of irrigated Staymens with the first car of Staymens packed the previous season. Although the 1928 season was a year of normal rainfall, the average size of the fruit that year was not as large as the irrigated fruit this past season. Mr. Wissler says:

"My first car of irrigated Staymens, packed September 30, 1929, graded 423 bushels of 3¼-inch and larger, 108 bushels 3 to 3¼ inches and 32 bushels 2¾ to 3 inches, while the first car of Staymens packed during the 1928 season (not irrigated), graded, 180 bushels, 3¼-inch minimum, 182 bushels, 3 to 3¾-inch and 271 bushels, 2¾ to 3 inches. In other words, over two-thirds of the irrigated fruit graded 3¼ inches and larger, while most of the fruit in the 1928 season graded in the smaller sizes. The irrigated fruit had much less russet than the fruit in the dry part of the orchard and there was noticeably much less drop from the irrigated trees."

While visiting the Wenatchee apple section of the state of Washington a few years ago, I asked several successful growers if they thought the irrigation of Eastern orchards would pay. These men invariably said they would not attempt to raise apples in the East without irrigation. Mr. C. W. Chase, a successful orchardist of Wenatchee, said:

"I was reared on a New York farm where we had a good commercial orchard. After my experience with irrigation here in the West, I am convinced that the irrigation of apples and other fruit would pay on Eastern orchards. I would not attempt to raise fruit anywhere without irrigation."

A successful Virginia apple grower, Mr. G. J. Hopkins, in telling me of his experience, said:

"A few years ago during an ex-

The water is carried throughout the orchard by shallow furrows running parallel to the tree rows

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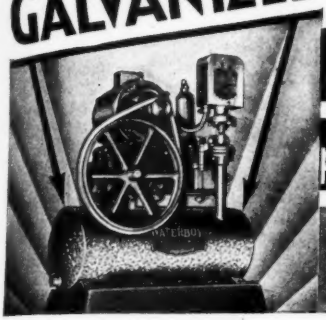

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tended drouth, I hauled water in my spray tanks to nine hundred Early-Transparents. I had a fine yield of good fruit on these trees and sold the fruit for the best price in years. All the Early-Transparents in other orchards in my section were a complete failure due to the dry season. This experience convinced me of the value of irrigation in a dry season."

Increases Income

The experience of Mr. Wissler seems to demonstrate that the Eastern fruit grower raising a high quality product, and situated where a sufficient supply of water can be secured and distributed satisfactorily at reasonable cost, has an opportunity of increasing his income by means of irrigation.

In years of general drouth and short crops with consequent high prices for fruit, the grower who can irrigate is indeed fortunate, as it is in such years especially that irrigation will pay handsome dividends.

Information on irrigation may be secured from the Division of Agricultural Engineering of the United States Department of Agriculture, Washington, D. C.

No Substitute for Cleanliness

"There is no substitute for cleanliness!" has been adopted as the slogan for the poultry program of Ohio by the extension specialists of that state. Sanitation in the poultry ranges and houses, to a degree which would have been regarded as absurd even in the country homes before running water was known, is the essential and only successful method for the prevention of poultry diseases which cut heavily into poultry profits and which are more expensive to cure than to avert, say the specialists.

Government surveys have shown that there is no single factor which has so great an influence on the health of the family as running water, which makes possible a new standard of hygiene in the home. The convenience of water under pressure also makes possible a higher standard of sanitation to protect the health of poultry and livestock on the farm as well as members of the household.

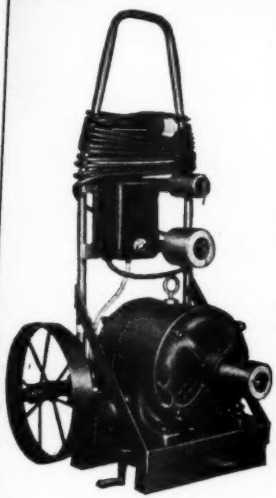
Water is indispensable in cleaning, whitewashing and disinfecting and its availability will to a great extent determine the quantity and extent of its use. All practical measures designed to prevent the outbreak or spread of disease are based on an adequate water supply. Clean range and sun parlors for baby chicks and growing pigs are of no avail unless the brooder and pig houses are kept clean to a hospital-like degree.

A power sprayer for whitewashing, disinfecting and spraying for mites and lice, is also a first aid for the practice of poultry and livestock sanitation on the farm. "Sweep, scrub, scrape, then disinfect" has been prescribed by the Ohio experts as the way to insure a laying house that will be filled by thrifty pullets this fall. Water under pressure will loosen up the dirt so that little or no scraping may be required. Whitewash, disinfectant or an oil mixture from a power sprayer will reach every corner and penetrate the cracks and make certain that a thorough job has been accomplished.

Thin Beets by Machine

Southwestern Nebraska and nearby sections of Colorado and Wyoming constitute one of the largest sugar beet growing territories in the United States. The area is characterized by judicious use of cost reducing equipment, and much is being done to eliminate part of the hand labor heretofore necessary.

This spring, beet growers are using a new method of blocking or thinning their crop. Multiple-row cultivators, equipped with shovels which leave a four-inch space in every foot of row, are driven crosswise of the rows. Blocking in this way is quick, and also serves as a cultivation. Hand laborers thin to one plant per hill after the cultivator.



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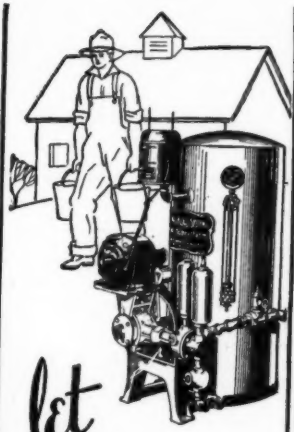

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The Ironing Machine

THE second Tuesday in April came out warm and sunny. A little breeze bent the tops of the lilacs at the end of the porch. I stopped on the top step on my way out to the car for a hurried trip to town and called back to my niece that it looked like a good day to wash the linen curtains in the living room. I was delayed, as we so frequently are on trips to town, and when I got back I found the curtains piled in the kitchen all washed and dry again.

"And what do you think?" asked Frances. "Mrs. Bennett, that new woman over in the old Milton house, came over and asked me if we didn't want to use her ironing machine for all those curtains. I told her we certainly would like to very much. Uncle Ed can go and get it any time."

We were so thrilled with the prospect of getting our curtains ironed easily and quickly that we promptly dumped another load of curtains into the washing machine to have them ready, too.

The narrow metal shoe, curved to fit the roll, is the electric iron.

After lunch my husband went over to Bennett's for the ironer, and came back across the road in a few minutes with an armful of ironing machine on his chest. Those portable ironers have been stripped down to essentials; there is practically nothing to them but the iron and the ironing board and the motor that turns it.

The ironing board is a padded roll about eight inches in diameter that goes round and round on a shaft of the upright post at the right-hand end.

The iron is a narrow curved shoe fixed to the same post. This shoe fits tight to the roll—and it is held against it or pushed back from it at the touch of a lever like the gear shift on your car.

The motor that turns he roll is built into this upright arm that carries both ironing board and shoe. That arm is fastened to a metal base that extends under the roll.

Ed brought the machine in and set it up on a work table in the kitchen. I plugged it into the convenience outlet on my range—and in fifteen minutes I began running those long, heavy linen curtains through the machine. I folded them once and ran them through that way. I turned them over and ran them through the other way. I folded them again and sent them through once more. That left them smooth and glossy.

Around twilight, when the curtains were all back in place, I went out with my husband to take the iron back. I felt that I had to thank the new neighbor with my very own words. Then I sat a spell and we talked about the ironer while my husband went out to the barn to pass the time of day with her husband and sons.

"Is that machine hard o take

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care of?" I asked.

"Not a bit. All I do is follow the manufacturer's directions. Sometimes a little starch sticks to the shoe. Then, of course, I have to scape that off with a knife and rub the surface smooth with a little emery cloth, for, of course, the first essential of any iron is a hard smooth surface. The shoe on my iron, as you probably noticed, is steel. I rub beeswax over it now and then. That keeps it in good shape. My sister's machine has an aluminum shoe; a cousin of ours bought a machine with some kind of enamel shoe."

"Do you do all of your ironing with the machine?" I asked. I already felt myself coming down with a bad attack of needing one of those machines.

"Most of it—not all of my dresses, nor some of the girls'."

"Would you mind telling me how you go about an ironing? I know I'm asking a lot of questions, but I am truly interested."

Mrs. Bennett smiled and settled herself more comfortably in the roomy chintz-covered chair.

"I'm glad to talk about it. Of course, every woman works out her own routine—but you're more than welcome to my experience.

"I always claim that the ironing begins out at the line, so when I take my clothes down I fold the linen to fit the roll of my machine and pile all the at pieces together."

This roll turns round and round carrying the linen past the iron

"How do you dampen the clothes?" I asked. "It seemed to me I got some of my curtains too wet."

Mrs. Bennett smiled broadly.

"Some folks say dampen them just the same. Some folks say dampen them more, and some folks say don't dampen them nearly so much. Far as I can see, you do it just to suit yourself."

"Then in what order do you iron them?" I pressed the question, for I could see the men dawdling along toward the house.

"I get everything ready, so's when I set down, I won't have to be jumping up and wasting time and heat. Then I begin with handkerchiefs, some every-day towels, and bath towels, too, while the iron is heating up. Then when it gets hot, I begin on shirts and the table linen. I do not do the shirts all at once. Doing a dozen or fifteen shirts hand running is too much. So I alternate with table linen or sheets and pillow cases. I try to move things from one end of the iron to the other, so I won't let any part of the iron get too hot—and so I won't put all the wear on the middle of the roll, pack the padding down hard, and make the roll lumpy. I save some of the undampened things for the last and finish them after I turn off the current."

The men stepped up on the porch and I rose to go.

"You can take it any time," Mrs. Bennett interrupted my final words of thanks. "It'll iron acres of sheets mighty easy."

* * *

Dessert for Sunday Dinner

STRANGE as it may seem, I have found people who turn up their noses at strawberries and cream day after day. Undoubtedly, the makers of recipes had them in mind when they devised this strawberry mousse to make in a mechanical refrigerator. It is simple, as summer desserts should be. And folks find it very, very easy to eat. The ingredients are:

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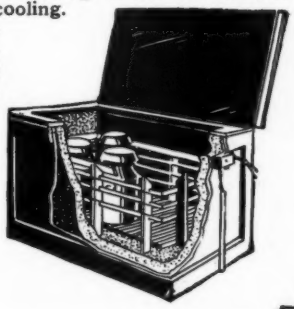

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1 teaspoon gelatine
1 cup strawberries
2 tablespoon lemon juice
¼ cup sugar
1 cup cream whipped.
This makes enough for six.

First, I soak the gelatine in cold water for about five minutes; then I dissolve it over boiling water. I rub the strawberries through a sieve, add the lemon juice, a pinch of salt, the sugar and the gelatine. I turn this into the deep tray of my electric refrigerator and chill it thoroughly. When it begins to thicken, I fold in the whipped cream. It needs no stirring while it is freezing.

A plain sponge cake goes well with this mousse. Here is one that I often make because it is light and fluffy, but not too extravagant with eggs. It takes:

4 eggs
½ cup cold water
1 cup sugar
¼ teaspoon salt
1 teaspoon flavoring
1½ cup pastry flour sifted four times
1½ teaspoon baking powder.

I put the four egg yolks in the bowl under my kitchen motor and set that motor to beating the eggs while I get out the rest of the materials and sift the flour. When the yolks are thick and lemon colored, I begin adding the water, a little at a time. I beat them until they stand up thick and stiff. Then I rinse off the egg whisk, and put it back on the motor to beat the egg whites while I fold the sugar, the salt and flavoring, and last, the flour into the beaten yolks. Then I add the egg whites beaten as I would beat them for angel food, stiff, but not dry. I use an ungreased angel food tin for this cake and bake it twenty-five minutes in a 375 degree oven. Then I turn the heat off and make it five minutes more on stored heat.

Sometimes when we have company and I can use the whole cake up at once, I make the cake itself a complete dessert by adding a frosting with strawberries in it.

I put one cup of sugar, one cup of strawberries, and one egg white into a bowl and beat them up with the electric motor until the mass stands up like a fluffy boiled frosting. I pile this on the cake and cut it at the table. When I used to do it by hand, it took twenty minutes of beating to make this frosting. The motor does it in two or three, I can't say exactly for I have never timed it. The appearance of the frosting tells me when it is done.

Five Hundred and Ninety-Seven Ton-Litters in 1929

Nearly 600 ton-litters were produced during 1929 in 25 States extending from Massachusetts to Washington, and from Minnesota to Texas, Dr. C. D. Lowe, extension animal husbandman of the United States Department of Agriculture, announces. The term "ton-litter" is used to designate a litter of pigs having a combined weight of 2,000 pounds or more at the age of six months.

Swine raisers in Ohio produced 98 ton-litters, the largest number of any State. Tennessee was second with 75 litters. Indiana and Kentucky were tied for third with 3 litters each, followed closely by Minnesota with 61 and Pennsylvania with 59 ton-litters, respectively. The heaviest litter in the year's contest is reported from Pennsylvania, the litter containing 17 pigs weighing 3,987 pounds at six months of age.

Feeding Helps Sick Trees

A recent development in the care of shade trees is the importance now given to "feeding" a sick tree before a lot of surgical work is attempted. Workers in the United States Department of Agriculture explain that this does not mean that pruning and other surgical work is not necessary, but if a tree is not vigorous an application of plant food is likely to prove very helpful in restoring the tree to a healthy condition.

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12 Time Switches
120 Reflectors
13 Drinking Fountain Warmers
14 Ultra Violet Light
15 Egg Testers
16 Oat Sprouters
17 Sprayers (Paint & Disinfectant)

CROPS
21 Feed Grinders
210 Ensilage Cutters
211 Oat Hullers
22 Hay Hoists
23 Feed Mixers
24 Fruit & Vegetable Graders
240 Fruit & Vegetable Washers
25 Food Dehydrators
26 Grain Graders & Cleaners
27 Portable Elevators
28 Stationary Spray Plants

WATER SUPPLY
31 Automatic Water Systems
310 Pump Jacks
32 Irrigation Systems
33 Sewage Disposal Equipment
34 Plumbing Fixtures
35 Water Softeners
36 Water Heaters

HOUSEHOLD
41 Ironing Machines
410 Dishwashers
411 Flat Irons
42 Household Motors
420 Electric Clocks
421 Ice Cream Freezers
422 Food Preparing Machines
43 Ranges
430 Hot Plates
44 Refrigerators
45 Sewing Machines
46 Table Appliances
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48 Clothes Washers

REPAIR AND MAINTENANCE
51 Soldering Irons
510 Tool Grinders
52 General Purpose Motors
53 Drills
54 Paint Sprayers
55 Saws
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57 Concrete Mixers

ENTERTAINMENT
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610 Radio Battery Eliminators
62 Radio Tubes
63 Home Movie Projectors
64 Electrical Toys
65 Talking Machines

WIRING AND LIGHTING
71 Incandescent Lamps
710 Floor and Table Lamps
72 Lighting Fixtures
73 Wiring Supplies
74 Decorative Lighting
75 Highway Lighting

DAIRY
81 Bottle Washers
82 Churns
83 Cream Separators
84 Dairy Sterilizers
85 Milk Coolers
86 Milking Machines
87 Milk Testers
88 Clipping Machines
880 Grooming Machines
89 Dairy Water Heaters

MISCELLANEOUS
91 Burglar Alarms
910 Portable Heaters
911 Heating Pads
912 Therapeutic Lamps
913 Curling Irons
93 Milk Warmers
94 Fans
941 Insulating Materials
95 Floor Polishers
96 Ventilators
97 Air Purifiers
98 Insect Traps and Screens
99 Oil Burning Furnaces

— — - TEAR OFF HERE — — —

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Nos. .....
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Name .....

Address .....
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I get electricity from.....
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For information on Equipment Not Listed Above, Write on Margin 7-30

Questions and Answers

Conducted by H. J. GALLAGHER
Agricultural Engineering Dept.
Michigan State College

Note—Readers are invited to send in questions which will be answered in the order received. Names are omitted from questions unless otherwise specified.

Question: *What would be the largest motor that we could use on a 5 ampere 110-220 volt meter, or what size motor would we have to have to run a buzz saw, concrete mixer and corn sheller?*

H. J. GALLAGHER

Answer: Meters are usually constructed to care for a 100% overload. A 2 H. P. motor on 220 volt service or a 1 H. P. motor on 110 volt service could be operated through a 5 ampere meter. However, this would not be good practice. Many power companies limit the size motor on 110 volt service to ½ H. P. to avoid too unbalanced a condition in the service line.

The size of the entrance service switch and not the size of the meter determines the amount of power that can be used. A 5 ampere meter on a three wire service would indicate a 30 ampere switch. Usually a 15 ampere meter is connected with a service of this size, but sometimes a 5 ampere meter is used until the load justifies the larger meter.

From a 30 ampere service a 4 H. P., 220 volt motor could be operated, but it would be better practice not to use larger than a 3 H. P. so that some power will be available for lighting and other uses at the same time. If you contemplate using a 2 H. P. or larger motor, notify your power company and I think they will be glad to install a larger meter.

Corn shellers vary greatly in capacity and power requirements, a ½ H. P. motor will run the average farm corn sheller.

1 H. P. motor is large enough for a farm size concrete mixer.

A buzz saw should be powered with a 5 H. P. motor. This would necessitate the changing of your service to at least 60 amperes and would prove an economical thing to do as it would then permit you to really use electricity.

Question: *I have 110-220 volt service through a 30 ampere switch and would like to use a 5 H. P. motor. The motor only draws 25 amperes, but our power company says I need a 60 ampere service to run the motor. If the motor only draws 25 amperes, why is my 30 ampere service not big enough?*

Answer: Operating at normal load a 5 H. P. motor requires about 25 amperes on 220 volt service. Operating at only 20% overload would require 30 amperes, the full capacity of your service. Under most farm conditions, such as feed grinding, silo filling, and running the buzz saw, the electric motor must deliver from 100% to 200% overload at peak conditions, which would be beyond the capacity of your service.

The starting current is greater than the amount required under normal load.

The starting of the motor may be compared to the starting of an empty wagon: it takes more power to start it than it does to pull it. If the wagon is loaded it takes more power than when empty; the same with a motor, and a motor is always started under load. A

COSTS BUT LITTLE

COMPLETE electrical convenience for the farm home and all other buildings costs but little if you specify KNOB & TUBE WIRING.

The KNOB & TUBE WIRING SYSTEM utilizes hard vitreous porcelain for insulation, the material employed by your power company for high tension circuits.

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Knox Porcelain Corporation
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Porcelain Products, Inc.
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This No. 2A furnished with universal mounting bracket to accommodate motor, one you have or we will furnish, with V pulleys and V belt for drive.

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Also the Standard No. 3 with motor direct-geared in enclosed housing.

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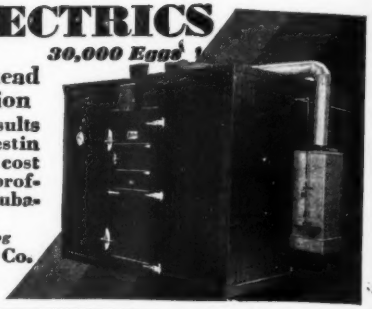

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Dept. B-551 2843 W. 19th St., Chicago, Ill.

See
Page 43
of this issue.

Questions and Answers

(*Continued from page* 44)

30 ampere fuse is not large enough to furnish the starting power even though it is large enough to run the motor at normal load after it is once started.

Shade Trees Need Food

Trees which have been transplanted or those which are not in a vigorous growing condition will usually show a decided response to an application of fertilizer, says the United States Department of Agriculture. Fertilizers which give immediate effect include nitrate of soda and sulphate of ammonia, applied broadcast in the spring or early summer at the rate of 2 to 5 pounds for a medium-sized tree.

The direct effect of such an application usually lasts for only a year, but the indirect effect may be apparent the following year, as it usually stimulates the healing of wounds made by pruning or cavity work. An excess amount of fertilizer or an application late in the season may cause injury by stimulating excessive development of foliage and failure to properly mature the new wood before winter sets in.

And this is the time of year that convinces every amateur gardener that the author of "Jack and the Bean Stalk" certainly must be the same fellow who wrote the seed catalogues.

Awards and Rules—Cover Title Contest

First Prize for May—$25.00

"The Power That Rules the Waves."

Lena Bayard, R. 1, Rices Landing, Pa.

The following titles have been selected as the winners of the $5 cash prizes:

"The 'wave of electricity' strikes Dolly."—Mrs. J. S. Kemp, R. 4, Ashtabula, Ohio.

"Mother's electric curler proves safe and sane. Even when used by little Jane."—Miss Ruth I. Burger, R. 3, Oneida, N. Y.

"When Mom's away, lil' girls will play, But it's always safe the 'lectric way."—Elsa Bentz, Station F, R. 9, Box 258, Milwaukee, Wis.

"Dolly's hair now looks real slick, The electric iron has done the trick."—Aroline Lockwood, R. 6, Milford, Mich.

"Young and old alike today enjoy the new Electric Way!"—R. M. Hamilton, 195 New Boston St., North Woburn, Mass.

Rules for July Contest

For the best title to the front cover illustration, a cash prize of $25.00 will be awarded.

In addition we will pay $5.00 for each of five titles given honorable mention.

In case of a tie, each winning contestant will receive the full cash prize to which he or she is entitled.

The winners will be announced in the September issue.

Only the farmers or members of the farm family, to whom this magazine was sent, are eligible.

Only one title may be submitted.

Use the form below or write your answers on a plain sheet of paper in similar form.

Be sure to answer question (a).

Write plainly and send your suggestion to the Title Editor, ELECTRICITY ON THE FARM, 24 W. 40th St., New York, before August 1.

My title for July Front cover picture is.....

.....

.....

.....

.....

(a) Check which way water is pumped on your farm?

- ☐ Hand Pump Jack
- ☐ Wind Mill
- ☐ Gas Engine Pump Jack
- ☐ Electric Motor Pump Jack
- ☐ Complete Pressure Water System (Shallow Well)
- ☐ Complete Pressure Water System (Deep Well)

.....

Name..... R. F. D.....

Post Office..... State.....

.....

Trees Must Have Water

Trees need enormous quantities of water to keep them in a healthy condition, says the United States Department of Agriculture. An apple tree 30 years old gives off approximately a barrel of water a day in summer, and a good-sized birch tree gives off nearly two barrels of water on a hot day. A single oak tree is known to have given off into the air in the form of vapor more than 100 tons of water in a single growing season.

Fertilize the Garden

If the garden is not doing well, some extra fertilization this summer may encourage the plants, says the United States Department of Agriculture. A top dressing with a complete mixed fertilizer, at the rate of 2 pounds per 100 square feet, may be applied. A mixture containing 5 per cent nitrogen, 10 per cent phosphoric acid, and 5 per cent potash, is suitable. Bone meal can be used at the same rate, but is slower in its action. If the plants have a poor color they may need nitrogen. This can be supplied by nitrate of soda or ammonium sulphate at the rate of one-fourth pound to 100 square feet. To distribute this amount evenly it is well to mix the fertilizer with sand, ground phosphate rock, or bone meal.

More Work with Larger Mowers

In certain sections of the South and East, which have been accustomed to the use of smaller sized mowers, there is a decided tendency toward displacement by those with longer cutter bars, either horse-drawn or tractor operated. With larger acreages of legumes from which several cuttings may be made, the mower is being called upon to do more work than formerly. Farmers are also buying new mowers, just as they are beginning to purchase other types of farm equipment, on the basis of amount of work they can do in a day. They are finding that a five foot mower will cut 10 acres each day as compared to 9 acres for one with a four and one-half foot cut. A six foot mower will cut 12 acres, while one of the larger tractor drawn mowers may be expected to cut from 25 to 35 acres.

Dull or worn knives, guards out of line and off center all cause side draft. Eight foot mowers, if kept properly adjusted, will have no more side draft than a five foot mower. Worn ledger plates, poor alignment or improper register between guards and sections in a small mower may give more draft than a new one of far greater capacity.

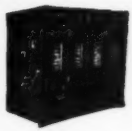
"Waterizing" the Rural Home

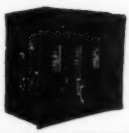
"THE home electrified is the home beautified," is a slogan the truth of which cannot be denied. Someone has suggested that the American public might coin a new word, unknown to Webster, which would be "waterized." "The home waterized is the home modernized," would be a fitting slogan for any farmer's home improvement organization.

Each year there is more interest being shown in modernization of farm homes. An example is furnished by the Farm and Home Bureau in Illinois which launched a "running water in every farm home" project a year ago, and which has just announced a continuation of the project for 1930. Quite similar programs can be cited in other states. Such work, which is often carried on by the state college extension service, or in cooperation with such departments is unquestionably doing a great deal to increase the number of fully "waterized" farm homes.

Mother (to her daughter's music master)—Do you think, Mr. Crochet, that my daughter will ever be able to do anything with her voice?

Music Master—Well, madam, it might come in useful in case of fire.





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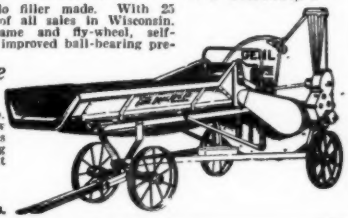
LOW SPEED - BIG CAPACITY

Lightest running, cleanest cutting silo filler made. With 25 different makes, the GEHL holds 40% of all sales in Wisconsin. A marvelous cutter with all steel frame and fly-wheel, self-feeding, clogproof, gears running in oil; improved ball-bearing prevents end play. Will stand the gaff.

Cuts and Throws More Corn at 500 r. p. m.

A SAFE speed using only 5 h.p. motor, cuts power costs to as low as $1.75 per silo. Post yourself on this time and money saver. Interesting catalog upon request. Also name of nearest dealer. Write today.



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Heating Units
for every farm purpose

25 types, all practical sizes For brooders, incubators, small buildings, water and feed tanks, pumps, hotbeds and drying. Space, Immersion and Conduction Heaters. Copper tube heaters—watts by the foot.

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"Electric Elements That Fit the Job"

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convenience
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to increase
your dairy profits"
LIPMAN MILK
COOLING SYSTEMS
Address
GENERAL REFRIGERATION CO.
2407 SHIRLAND AVE., BELOIT, WISCONSIN

The Milking Machine

I have been running a dairy a good many years. Several years ago we put in a milking machine to run with a gas engine. The milker was always ready. If the engine went, all right, and if it didn't go we had to milk by hand. But now we run it with electricity and it always goes. No more milking by hand, and as I am 75 years old, that's what suits me.

J. C. Bostwick,
Box 922, Ardmore, Okla.

An Electrical Pal

Partiality! All good teachers against it. Yet with all my school duties, I am a farmer's wife and the mother of two small girls. Is it any wonder that among my ten electrical pals my range is a favorite?

It is attractive. It is more comfortable, because it is cooler when not in use. It is economical, saving hours of kindling, redecorating and cleaning. It is a convenience and satisfaction to find the previously prepared dinner ready and waiting in the automatic oven to be served. More delicious? Yes.

Indeed, my range is "My Favorite Electrical Servant."

Mrs. R. C. Pennington.
Clinton, Mich.

Handy Ann

My electric servant I adore
Without it I could not clean my floor
The dust and germs are quickly gone
While my electric servant goes steadily on
Until everything is spic and span
It is indeed my "handy ann."

I know you'll all agree with me
The electric cleaner is the best thing that can be
To help the busy farmer's wife
And by saving her strength prolong her life
And give her time to laugh and play
And make her happy all the day.

Dorothy Buchman,
R. D. No. 2, Phillipsburg, N. J.

Vacuum Saves Work

Running a vacuum cleaner is much easier than sweeping with a broom. Brooms merely remove the larger particles of dirt and raise a great amount of dust, which settles on everything. The vacuum cleaner not only saves work and time, but it cleans everything thoroughly. The small amount of current it takes to run a vacuum is surely worth while, when you stop and consider the time and work it saves.

Pearl Hansen,
Clarks Grove, Minn.

A Real Treasure

We have many electric servants,
All faithful, tried and true,
But the one I treasure most,
dear friends,
Is my washer, fine and new.

I used to do our washing
With an old hand-powered machine,
And would rub my hands to blisters,
To get those clothes all clean.

I was tired in soul and body,
When that irksome task was done,
It even seemed to darken
The glory of life's sun.

But now my faithful helper
Frees me from this drudgery,
Is safer, cleaner, quicker, cheaper,
Thanks, dear God, for electricity.

Mrs. Emily Alice Patz,
R. 1, Blackfoot, Ida.

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The LYON ELECTRIC COMPANY manufacture electric poultry equipment exclusively. Long, practical experience in the highly developed California rural electric field enables us to furnish quality devices at reasonable prices. The LYON line includes: Brooders—Incubators — Egg Testers — Burglar, Temperature and Power-off Alarms—Heating Elements—Thermostatic Supplies—Time Switches—Wiring Supplies. Write for catalog today. LYON ELECTRIC COMPANY, 2075 Moore Street, San Diego, California.